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THE URINE IN NORMAL PREGNANCY.

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One is likely to be led into error if he examines the urine of a pregnant woman and expects it to correspond closely with that of the non-pregnant.

During the last few years the writer has had the opportunity of examining several hundred specimens of urine from about one hundred pregnant women. The majority have been patients of Dr. E. B. Cragin. The subject was approached with no expectation of finding the conditions very different from what obtains in the non-pregnant, with the exception that we are dealing with two individuals, and that the host is eating, drinking, breathing, and excreting for herself and the parasite. We might, then, expect some increase in the solid constituents of the urine. The examinations made have been chiefly of the urine of the fourth to the eighth month of pregnancy; very few in the third month and few in the two to four weeks preceding delivery. In the literature the studies of metabolism in pregnancy have concerned themselves chiefly with the last weeks of pregnancy, a time when the patients may be in lying-in institutions, and, hence, susceptible of much more careful observation than at their own homes.

The following statements have been based upon routine examiations of urine, and not on selected cases, where pregnancy was known or suspected to be following an abnormal course. It had not been my custom till within the past few months to preserve urinalyses, but there is little doubt that the deductions based on the last hundred consecutive analyses would not be considerably modified had all the analyses been available. Excluding all abnormal cases, we will base the following statements on examinations of twenty-five patients' urine. Two to six examinations have been made in the different cases, and the intervals between examinations were usually about two weeks.

One difference between the urine of the pregnant and the non-pregnant was so noticeable as to early arrest attention. This was the lowering of specific gravity. The average of all determinations has been 1013. Patients have shown some individual variations.

The highest averages have been 1018; on the other hand, other averages have been as low as 1006, 1009 and 1010. None of the extremes, either high or low, have been based on more than three determinations. The more numerous the determinations the more likely the average for the individual to approach the general average of 1013.

With these facts in mind there can be no doubt that *the urine of the pregnant woman, normally and with great constancy, has a specific gravity considerably lower than that of the non-pregnant.*[1]

This observation may be variously accounted for by those who admit its truth. Of course, any change of specific gravity must be due to a change in water elimination, excretion of solids, or of both combined. If both are increased or decreased together the specific gravity would not be altered.

As regards the water elimination, it has to be admitted that many of my specimens were not from the mixed and measured urine of twenty-four hours. In cases where the patient was required to measure the quantity it was usually because of something abnormal developing, and hence such analyses are excluded from consideration.

Nevertheless, at times the quantity has been measured in normal cases, and has nearly always been found above fifty ounces. This quantity will be admitted to be above the average in non-pregnant women. Fifty to sixty ounces may be considered quite usual in pregnancy.

Slemons (*Johns Hopkins Hospital Reports*, vol. xii.), in four cases carefully studied in the last few days of pregnancy, found no great uniformity in the daily quantity of urine. His three normal cases each showed considerable daily variation, with the average quantity under fifty ounces. In his fourth case of dead twins the quantity was daily in excess of sixty ounces. But no one would consider the conditions present in the last week of pregnancy an index of conditions in the earlier months. The nausea and distress present in the last days of pregnancy often diminish the amount of fluid taken. Many of the patients whose urine is here considered have been advised to drink large quantities of fluid. This might reasonably be expected to affect the specific gravity. On dividing the series of cases into those that had and those that had not been advised to drink copiously, and taking the average, the difference is found to be only one point. The general average as already mentioned is 1013, while those who had not been advised to drink copiously showed a specific gravity of 1014. Nearly all the examinations here included were made during the hot weather of summer and early fall, when one would expect the water elimination by kidneys to be less than at other parts of the year.

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[1] A number of examinations of urine recently made in the third month of pregnancy indicate that the lowering of specific gravity has begun in that month.

Regarding the amount of solids excreted, testimony is to the effect that the quantity is considerably less than in the non-pregnant state.

Cragin had the urine of one hundred women in the last month of pregnancy examined in the Sloane Maternity Hospital. He found three hundred grains of urea per day unusual. The average was about two hundred and fifty grains, as the result of determinations made by the hypobromite method. In two of his cases in private practice a daily average was maintained, upon a restricted diet, of only seventy-five grains of urea per day with no clinical evidences of toxæmia.

I have found a daily elimination of two hundred grains not very unusual in the latter months of pregnancy in women without evidence of renal insufficiency, on an unrestricted diet and going on to normal delivery at term.

This surprising diminution in nitrogenous elimination admits of several explanations.

No doubt it is in part due to the retention of nitrogen in the body to nourish the offspring. It might depend on modifications in the diet. Thus a patient of mine who, on her own initiative, took no red meat from the fourth month on, had a specific gravity of urine of 1010 as the average of five determinations. Another in the last weeks of pregnancy on a diet from which meat and eggs were excluded had a urine of a specific gravity of 1005 to 1008 in twenty-four specimens. The restriction in this patient's diet was because of œdema of the hands and feet; there was at no time albumin in the urine and labor and convalescence were normal.

The urea content of urine seems to be the most variable of the nitrogenous constituents and to depend largely on the diet, representing more the proteid broken up in the liver than the catabolism of the body tissues. Thus in some cases of pregnancy where we find the percentage of ammonia increased the absolute quantity is unaltered, but from the diminution of urea the percentage of nitrogen excreted as ammonia is increased.

In conclusion, we may say that in the fourth to eighth month of pregnancy the specific gravity of urine is considerably diminished. This depends on two conditions:

1. The pregnant woman during these months secretes rather more urine than the non-pregnant.
2. The nitrogen elimination is diminished. Three hundred grains of urea (determined by the hypobromite method) is above the average toward the end of pregnancy. This is in part explained by the body's retention of nitrogen and perhaps in part by variations in the pregnant woman's diet.

THE BACTERIOLOGY OF CONJUNCTIVITIS.[1]

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Bacteriology had no sooner made its appearance in medical science than ophthalmologists looked in this direction for knowledge to help clear up misunderstood conditions of the diseased conjunctiva.

In 1883 Koch, while working on the cholera epidemic in Alexandria, examined the conjunctival discharge in some cases of Egyptian ophthalmia. He found there two micro-organisms, a diplococcus, very similar to the gonococcus, and a very fine bacillus, which resembled the bacillus of mouse septicæmia. Two years later Weeks, of New York, had an opportunity of seeing numerous cases of acute conjunctivitis. In the conjunctival discharge he constantly found this short, fine bacillus which Koch had seen in Egypt. Weeks proved this bacillus to be the etiological factor in this form of conjunctivitis.

In 1886 Morax and Axenfeld separately described a diplobacillus, which they believed was the cause of a chronic form of blepharoconjunctivitis. This opinion was shortly afterward concurred in by Peters and Gifford.

In 1894 appeared the work of Parinaud and Morax on pneumococcus conjunctivitis, followed two years later by reports from Axenfeld, Gasparrini, and Gifford. From this beginning, some twenty years ago, the study of the bacteriology of the conjunctiva, both in

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[1] Read before the Montreal Medico-Chirurgical Society, November 3, 1905.